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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|--|-------------|----------------------|---------------------|------------------|
| 10/595,523 | 04/25/2006 | Masahiro Nakayama | 039.0071 | 2166 |
| 29453 7590 06/23/2009 | | | | |
| Judge Patent Associates Dojima Building, 5th Floor 6-8 Nishitemma 2-Chome, Kita-ku Osaka-Shi, 530-0047 JAPAN | | | | |
| EXAMINER | | | | |
| LEE, JAE | | | | |
| ART UNIT | | PAPER NUMBER | | |
| 2895 | | | | |
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| 06/23/2009 | | PAPER | | |

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/595,523

Applicant(s)

NAKAYAMA ET AL.

Examiner

JAE LEE

Art Unit

2895

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 23 March 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-3,5,11,12 is/are pending in the application.
- 4a) Of the above claim(s) 3 and 5 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,2,11 and 12 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/S5108)
Paper No(s)/Mail Date _____

- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Response to Arguments

1. Applicant's arguments, see page 4, filed 03/23/2009, with respect to the rejection(s) of **claim(s) 1, 2, 11, and 12** under 35 USC 112 have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Wilk et al. (Pub No. US 2004/0067660 A1, hereinafter Wilk et al.) in view of Freeouf et al. (USP# 5,508,829, hereinafter Freeouf et al.) and further in view of Yang et al. (Pub No. US 2004/0149810 A1, hereinafter Yang et al.).

Claim Objections

2. **Claims 1 and 2** are objected to because of the following informalities:
 - a. Claims 1 and 2 recite "...by one ore more selected from Si, Cr..."
Examiner submits that the reader may be unclear as to what the "one or more" is identifying. Examiner suggests "elements", "substances", "chemicals", etc.
3. Appropriate correction is required.

Claim Rejections - 35 USC § 103

4. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

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5. **Claims 1, 2, 11, and 12** are rejected under 35 U.S.C. 103(a) as being unpatentable over Wilk et al. in view of Freeouf et al. and further in view of Yang et al.

With regards to **claims 1 and 2**, Wilk et al. teaches a gallium-nitride semiconductor substrate onto which film has been epitaxially grown, the gallium-nitride substrate therein contaminated on its epitaxial-film side at a density level of from 15×10^{10} to 10×10^{11} atoms/cm² (or 5×10^{11} as per **claim 2**) (see ¶17, ¶27).

Wilk et al., however, does not teach growing a light-emitting device during the epitaxy process.

In the same field of endeavor, Yang et al. teaches how traditional light emitting diodes uses III-V compounds by using epitaxial wafer growth technology (see ¶2).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize III-V compounds for light emitting diodes since it is make conventional and well-known as taught by Yang et al.

Wilk et al. also does not teach the contaminant to be one or more selected from Si, Cr, Mn, Fe, Ni, Cu, Zn, and Al.

In the same field of endeavor, Freeouf et al. teaches how chromium atoms can function to trap charge carriers (see col. 16, lines 50-52, trap charges present in Wilk et al. in ¶27).

Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to acknowledge and recognize that

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chromium atoms are definitely one type of contaminant that can cause trapping of charge carriers as taught by Freeouf et al.

With regards to **claims 11 and 12**, Wilk et al. and Yang et al. teaches a gallium-nitride semiconductor substrate as set forth in **claims 1 and 2**, wherein the substrate surface on which the epitaxial film has been grown is a complex of faces in which Ga is exposed, and faces in which N is exposed (the gallium nitride substrate taught by Yang et al. will have exposed faces of gallium atoms and nitrogen atoms when the structure of gallium nitride is viewed at the atomic level).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JAE LEE whose telephone number is (571)270-1224. The examiner can normally be reached on Monday - Friday, 7:30 a.m. - 5:00 p.m. EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Drew Richards can be reached on 571-272-1736. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Jae Lee/
Examiner, Art Unit 2895

/Fernando L. Toledo/
Primary Examiner, Art Unit 2895

JML